NON-PUBLIC?: N
ACCESSION #: 8907050244
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Grand Gulf Nuclear Station - Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000416

TITLE: Reactor Scram Induced by Lighting Strikes Affecting Neutron Monitoring System
EVENT DATE: 08/15/88 LER #: 88-012-02 REPORT DATE: 06/28/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS
ER:
NAME: Paul M. Different/Licensing Engineer TELEPHONE: 601 437-2167

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: no

ABSTRACT:

On August 15, 1988 at 1553 hours the plant tripped on Average Power Range Monitors (APRM) Neutron Flux High signal. An electrical storm with lightning strikes was occurring in the general site area. Several APRM channels momentarily spiked high due to an inherent condition within the plant electrical grounding system which transmitted the voltage spikes to the APRMs.

All plant systems responded as designed. The APRM cabinets were visually inspected for general condition and for the presence of grounding straps. No obvious discrepancies were observed.

An engineering task force was assembled to investigate the root cause and recommend corrective actions to eliminate the problem. Results of a General Electric (GE) inspection team attributed the spike to a grounding strap for the plant security fence located on the roof of the Turbine and Control Buildings. The grounding strap was routed across the roof and down the side of the Control Building and then across the roof of the Auxiliary Building in

close proximity to the signal cables of the APRM channels that spiked. It then tied in with another grounding strap which is tied to the plant grounding mat. The grounding strap has been relocated to a non-sensitive area to prevent interference with the APRMs. The Scram Frequency Reduction Committee will continue to evaluate GEs recommendation for plant lightning protection until a final resolution is achieved.

END OF ABSTRACT

A. REPORTABLE OCCURRENCE

On August 15, 1988 at 1553 hours, the plant tripped on Average Power Range Monitors (APRM) Neutron Flux High signal. This event is reported pursuant to 10CFR50.73 (a)(2)(iv).

B. INITIAL CONDITION

The plant was in Operational Condition 1 at 100 percent of rated thermal power. A seasonal electrical storm was occurring in the general site area.

C. DESCRIPTION OF OCCURRENCE

On August 15, 1988 at 1553 hours, the plant tripped on an APRM (EIIS System Code IG) Neutron Flux High signal. An electrical storm with lightning strikes was occurring onsite. Several actual lightning strikes were observed by plant personnel at the approximate time of the plant trip. The APRM spikes recorded at the time of the event were as follows:

APRM CHANNEL Division Peak Indicated Flux (percent)

A 1 No spike
B 2 105
C 3 122
D 4 132
E 1 No spike
F 2 106
G 3 127
H 4 131

A full scram signal requires a trip of Division 1 or 3 in conjunction with a trip of Division 2 or 4. APRM channels C, D, G, and H exceeded their trip setpoints of 118 percent. The duration of the spikes was less than one-tenth of a second. An examination of recorded reactor pressure, core

flow and control rod status shows no evidence that actual neutron flux increased. No potential causes for a rapid reactivity insertion to produce such a neutron flux spike could be identified. Thus, it was concluded that a voltage spike was induced by the electrical storm and transmitted to the APRM channels causing the plant trip.

The APRM cabinets and associated cables were visually inspected for general conditions and for the presence of grounding straps. No obvious discrepancies were observed. The Local Power Range Monitors (LPRM) which provide the flux signals to the APRMs were monitored during the restart to check for proper sensitivity and response after the voltage spike. No unusual conditions associated with the LPRMs were observed.

The APRMs have a history of spurious high trips attributed to problems with the grounding system. Previous lightning storms have caused similar events on July 12, 1982 and July 27, 1983. Another event occurred on June 8, 1988 when APRM channels D and H tripped on Neutron Flux High giving a half-scram. A ground trip of a large fan was believed to have caused a voltage spike that was sensed by the APRMs

D. APPARENT CAUSE

An inspection team from General Electric (GE) was on-site the week of November 7, 1988 to determine the root cause of the APRM grounding problems. Results of their inspection determined the cause to be the location of a grounding strap for the plant security fence on the roof of the Control and Turbine Buildings separating Unit 1 and Unit 2. A lightning strike on or near the fence could create enough current in the grounding strap to create spikes in nearby cables.

The grounding strap was routed across the roof and down the side of the Control Building and then across the roof of the Auxiliary Building in close proximity to conduit runs containing Division 3 and 4 APRM signal cables. It then tied in with another grounding strap which is tied to the plant grounding mat.

Division 2 cables were located a little further away from the grounding strap while Division 1 cables were too far away to be affected by the grounding strap. This is consistent with the spikes recorded for each of the APRM channels during the event.

E. SUPPLEMENTAL CORRECTIVE ACTIONS.

An engineering task force was assembled to investigate the root cause and

recommend corrective action to eliminate the problem. Walkdowns of LPRM cable runs, APRM cabinet common grounds, and a review of past improvements to the plant grounding system were begun.

As a result of the recommendations and findings from the GE team; the grounding strap for the fence has been relocated to prevent interference with the APRMS.

The Scram Frequency Reduction Committee will continue to evaluate GEs recommendation for plant lightning protection until a final resolution is achieved.

F. SAFETY ASSESSMENT

A review of plant data shows that actual neutron flux did not increase. The APRMs tripped the plant on a Neutron Flux High signal induced by lightning strikes from an electrical storm.

This condition did not prevent the APRMs from performing their intended safety function, but did result in an unnecessary challenge to plant safety systems. All plant systems responded as designed. At no time was the health or safety of the public affected.

SYSTEM ENERGY
RESOURCES, INC,

A Middle South Utilities Company

June 28, 1989

WILLIAM T. COTTLE
Vice President
Nuclear Operations

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Reactor Scram Induced by
Lightning Strikes Affecting
Neutron Monitoring System
LER 88-012-02
AECM-89/0125

Attached is Licensee Event Report (LER) 88-012-02 which is a final report.

Yours truly,

JGC:cg Attachment W. T. Cottle
Attachment

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